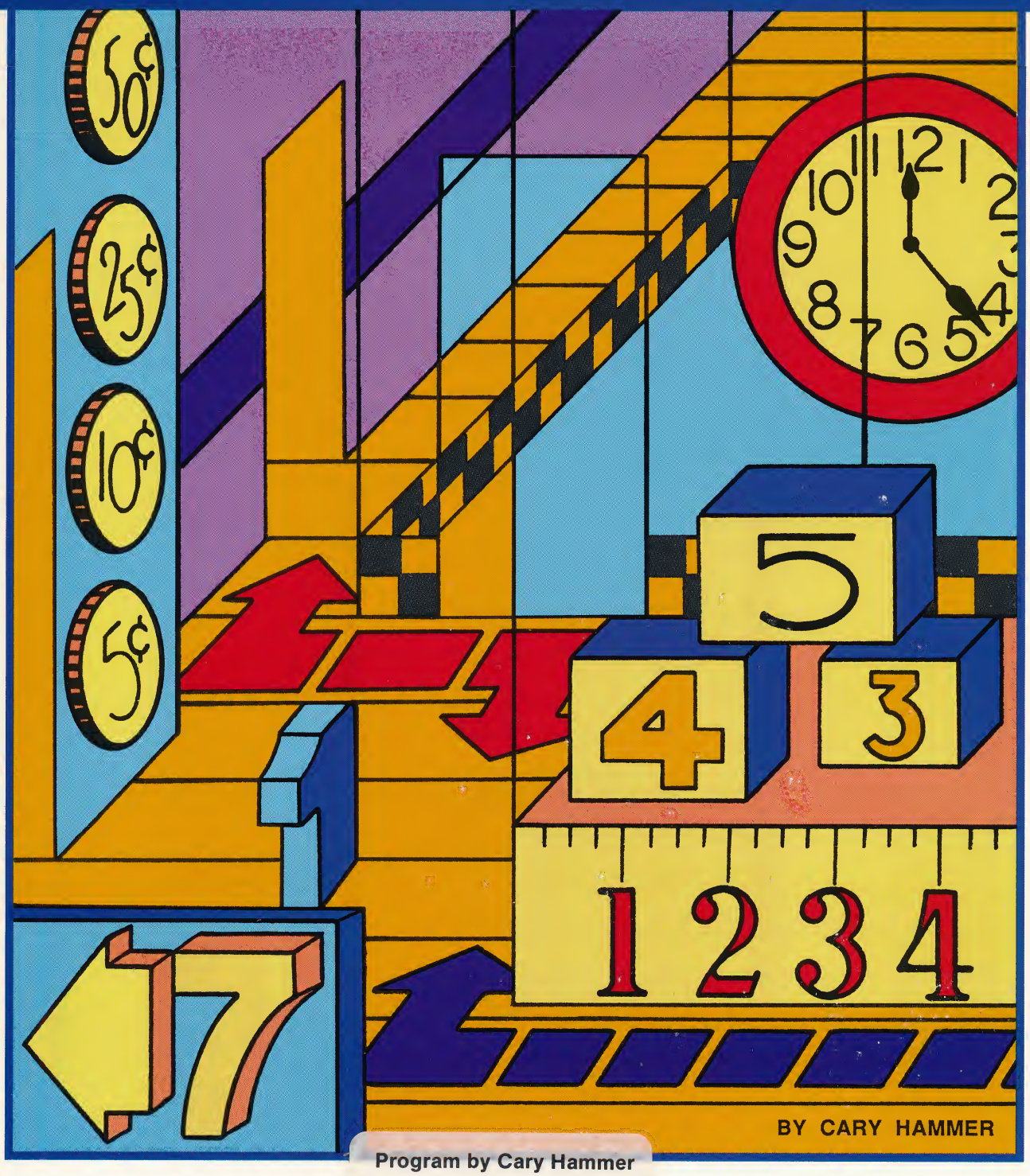
MATH SHOP JR.™

HELP YOUR KIDS IMPROVE THEIR MATH SKILLS WHILE THEY PLAY STORE



BY CARY HAMMER

Program by Cary Hammer

Apple® II Plus (64K),
*//*e, IIc, IIc Plus, or IIGS

SCHOLASTIC

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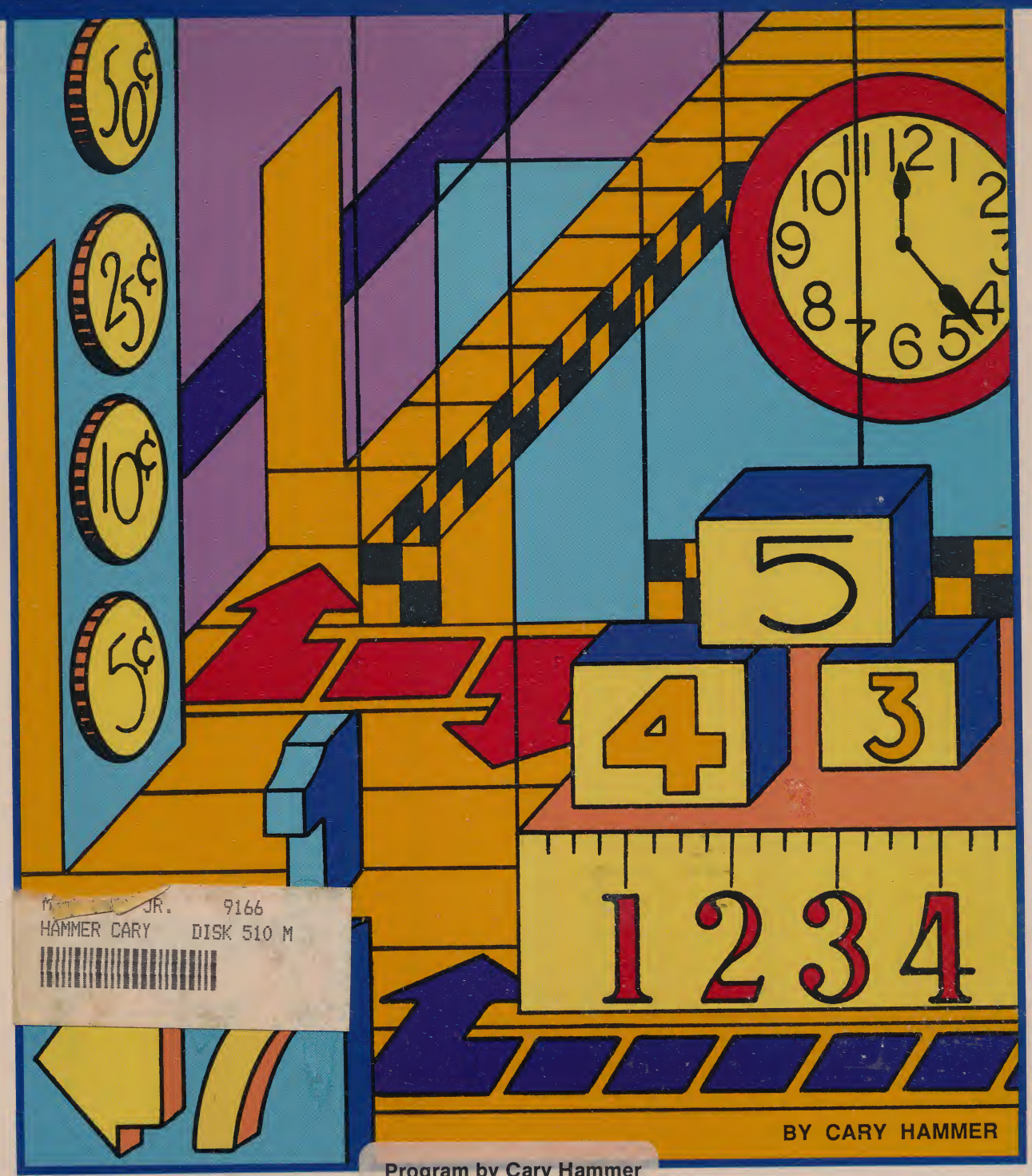

JR. 9166
HAMMER CARY DISK 510 M

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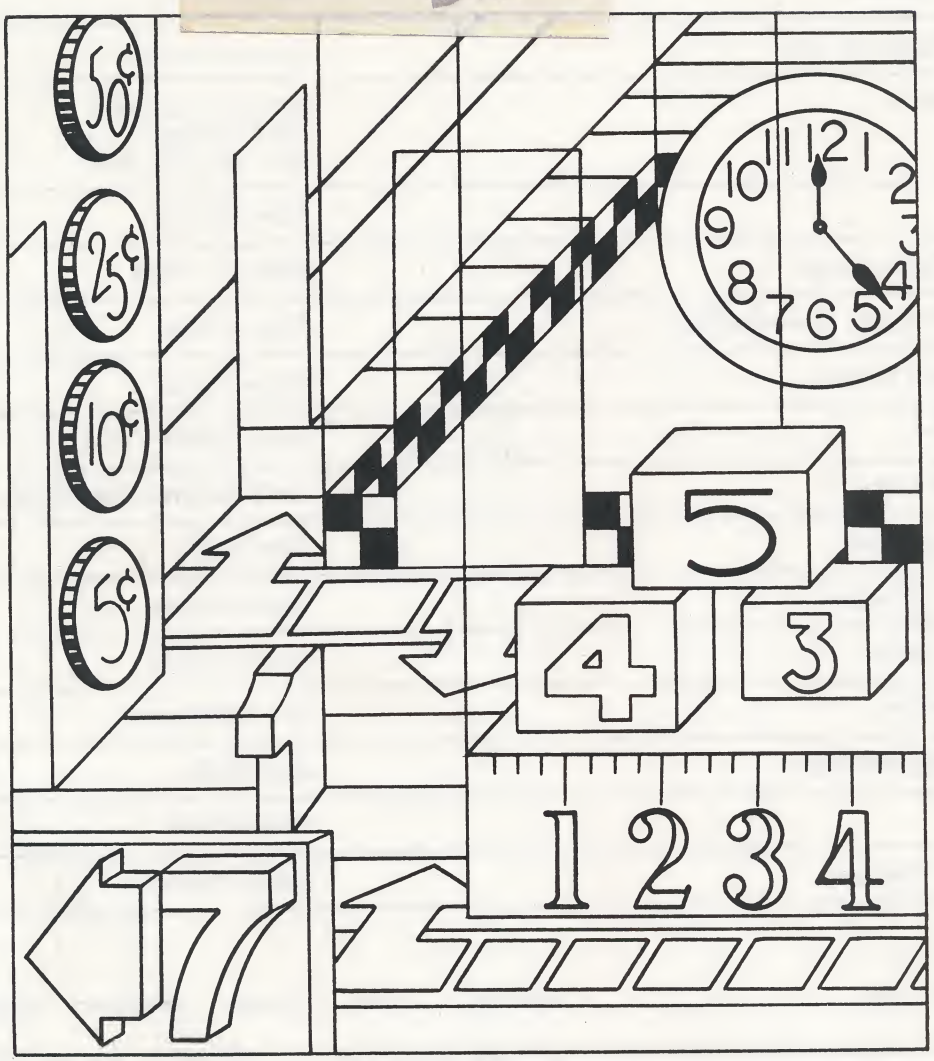

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INTRODUCTION

Your students are about to visit the *Math Shop Jr.*™ Mall. But this is no ordinary shopping mall! Here customers browse for yo-yos and shop for gizmos. Your students will fill shoppers' orders by using a variety of basic math skills.

Serving customers in the 10 *Math Shop Jr.* stores will be a fun and ever-changing challenge for your students. Each shop requires a different set of skills, and each customer wants something slightly different. Whether students are counting coins at the Bank or subtracting spiders in the Spider Shop, they will be putting their math skills to work. The longer they work in each store, the more complex the problems will become.

Problem Solving With *Math Shop Jr.*

Each of the *Math Shop Jr.* stores provides an interactive environment where students can explore all facets of a given problem. Each problem comes alive with graphics, moving numbers, and values that are calculated in response to students' entries. Because of its interactive features, *Math Shop Jr.* can be a wonderful discovery tool for many students.

In each shop, students are given an invitation to "mess around" with the numbers, trying many possible solutions. The computer automatically does some of the time-consuming calculations, leaving students free to concentrate on analyzing the problem itself. Looking at all of the numbers involved, students can think about how, why, and where a given answer doesn't work, try a different solution, and immediately see the results of the new answer. In the process, they will be performing mental calculations and practicing important estimating skills.

You will find *Math Shop Jr.* to be a useful program for all your students. It can serve as a motivator for students not yet interested in math or an enticing challenge for students who like to test and improve their problem-solving strategies.

Inside This Package

The *Math Shop Jr.* package includes a double-sided program disk, a backup copy of the disk, and this handbook.

Where Do I Start?

The Guide to the Program section, which follows the Introduction, contains information about running the *Math Shop Jr.* program on your computer. This section will help you get started. You'll learn how to load the program into your computer, how to choose between the One Shop game and the All Shops game, and how to turn the clock on and off. You'll also find helpful information describing how students will work in the *Math Shop Jr.* shops, including a list of important keys to know (page 12).

Once you understand how the program works in general, refer to the List of Shops and Skills, on page 15. From this list, select a shop that offers practice in an appropriate area for your students. Then turn to the page about that store, where you'll find a job description and a related activity.

Before using *Math Shop Jr.* with your students, try the program on the computer yourself. Exploring *Math Shop Jr.* on the computer will greatly enrich your understanding of the program. Each shop is completely different in its look, in the nature of its business, and in the math skills that are exercised. Because of the variety of shops, you should make a point to visit each one. Although the students' jobs in each shop are fully described in this handbook, the dynamics of working at the computer add elements that can't be illustrated on paper. By browsing through the shops at the computer, you can be sure to find an assignment that challenges each student at the appropriate level.

Set aside some time to explore some of the *Math Shop Jr.* shops in the One Shop game. Then, after you've had some practice, try setting the program to the All Shops game. Your more advanced students may find that working in the All Shops game is a challenging way to review their math skills and problem-solving strategies.

Finally, be sure to familiarize yourself with the information in the Using *Math Shop Jr.* in Your Classroom section on page 13. Refer to this section to find out how *Math Shop Jr.* can best meet the various needs of your students and your schedule.

Getting Started (Apple Computer)

Equipment You Will Need

- Apple II Plus (64K), *IIe*, IIc, or IIGS
- One disk drive and monitor (or TV)

Loading *Math Shop Jr.* Into Your Apple Computer

Follow these steps to load *Math Shop Jr.* into your computer:

1. Insert the *Math Shop Jr.* disk in the drive, label facing up, and close the drive door.
2. Turn on the monitor or TV; then turn on the computer. The disk drive will whir as *Math Shop Jr.* loads. Do not remove the disk while the drive's red light is on. An introductory text screen will appear.
3. When you have read the introduction, press Return.
4. Follow the instructions on the screen to turn the disk over to Side 2, label facing down, reinsert it, and press Return. The *Math Shop Jr.* Mall will appear on the screen.

NOTE: If you are using the 3.5-inch Math Shop Jr. *disk, you do not need to turn the disk over.*

NOTE: If you are using an Apple IIGS or IIc Plus, be sure to set the system speed to Normal before working with Math Shop Jr.

Getting Started (IBM, Tandy, or MS-DOS Compatible)

Equipment You Will Need

- An IBM PC with Color Graphics Card (CGA), PC *jr.*, Tandy 1000, or an IBM compatible computer with 256K of memory
- A double-sided disk drive
- A monitor or TV
- A DOS disk (version 2.0 or higher)

Installing DOS on the *Math Shop Jr.* Disk

Before using the *Math Shop Jr.* disk, you may want to copy the DOS files to it so that you can start up *Math Shop Jr.* with the program disk alone. This procedure is called "installing" DOS. To install DOS onto your *Math Shop Jr.* disk, follow the steps below. You'll only have to go through these steps once. After you've installed DOS onto your program disk, you will not need your DOS disk when working with *Math Shop Jr.*

NOTE: If you are using a PC jr., *or if you are using certain versions of DOS or certain combinations of disk drive sizes, you will not be able to install DOS on your* Math Shop Jr. *disk. To load the program, follow the instructions on page 9 for loading* Math Shop Jr. *without DOS installed.*

To install DOS on the disk:

1. Make sure your computer is turned off.
2. Turn on your monitor.
3. Insert the DOS disk that came with your computer into Drive A. (Make sure that it is DOS version 2.0 or higher.)
4. Turn on the computer. Prompts will appear on the screen telling you to enter the date and the time. Press Enter twice to skip these requests, or enter the date and the time, and press Enter after each entry. When the A> prompt appears on your screen you are ready to install DOS.
5. If you have two disk drives:
   - Leave the DOS disk in Drive A and insert the *Math Shop Jr.* disk in Drive B.
   - Type **B:INSTALL**. Press Enter.

   If you have one disk drive:
   - Type **B:INSTALL**. Press Enter.
   - Remove your DOS disk from the disk drive and insert the *Math Shop Jr.* disk.
   - Press any key to continue.
6. Read the message that appears on your screen and press any key to continue.

   If you have one disk drive, you will be asked to switch disks several times. Place the DOS disk in the drive when you are asked to insert the disk for Drive A. Place the *Math Shop Jr.* disk in the drive when you are asked to insert the disk for Drive B. Make sure to wait until the drive's red light is off before removing a disk.
7. When DOS has been successfully installed on the *Math Shop Jr.* disk, the A> prompt will appear on your screen. The disk is now ready for use.

Loading *Math Shop Jr.* Into Your IBM, Tandy, or MS-DOS Compatible Computer

If you have installed DOS on your *Math Shop Jr.* disk, follow these steps:

1. Insert the *Math Shop Jr.* disk into the drive, label facing up, and close the drive door.
2. Turn on the monitor or TV and the computer.
3. The disk drive will whir as *Math Shop Jr.* loads into the computer. Do not remove the disk while the drive's red light is on.

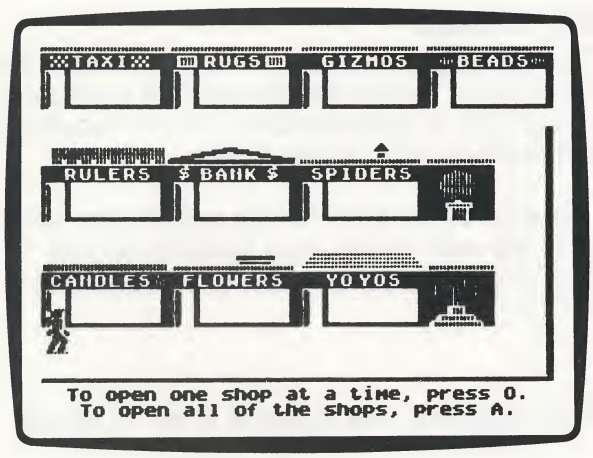
If the program does not load, it may mean that you are using a type of DOS that cannot be installed on your *Math Shop Jr.* disk. To load *Math Shop Jr.* without installing DOS, follow the instructions below.

If you have not installed DOS on your *Math Shop Jr.* disk, follow these steps:

1. Insert your DOS disk into the drive.
2. Turn on the monitor and the computer. Prompts will appear on the screen telling you to enter the date and the time. Press Enter twice to skip these requests, or enter the date and the time and press Enter after each entry. The A> prompt will appear on the screen.
3. Remove the DOS disk from the drive and insert the *Math Shop Jr.* disk, label facing up.
4. Type **Junior** and press Enter.

Choosing a Game

When you first load *Math Shop Jr.* this message will appear at the bottom of the mall screen: "To open one shop at a time, press O. To open all of the shops, press A."



Follow these steps to choose a game:

One Shop Game Press O to play the One Shop game. In this game students can work in one shop at a time.

The program will ask, "Do you want to work against the clock? Y/N."

Press N, for No, if you want students to have unlimited time to work in any shop in the mall. (Read about the One Shop game without the clock on page 10.)

Press Y, for Yes, if you want students to test themselves against the clock. (Read about the One Shop game with the clock on page 10.)

All Shops Game Press A to play the All Shops game. In this game students will test themselves against the clock and try to wait on as many customers as possible in all of the shops. (Read about the All Shops game on page 10.)

The One Shop Game Without the Clock

To become familiar with *Math Shop Jr.*, start by choosing the One Shop game without the clock. In this game students can go into any shop they want and serve customers at their own pace. The game ends when Esc is pressed to leave the shop.

When students enter a shop, the "customers served" sign appears at the top of the screen. This keeps track of the number of customers that have been served.

In this game, students don't need to hurry. Customers wait patiently until their orders are filled.

After students successfully serve a customer, they move on to the next one. Students can continue working until they want to quit. Pressing Esc returns them to the mall where they can choose to enter a different shop and serve customers, or press Esc again to play a different game.

The One Shop Game With the Clock

This game is played the same way as the One Shop game without the clock, except that when students enter a shop they try to serve as many customers as possible during a 9 to 5 shopping day. (The actual time from 9:00 to 5:00 is approximately 7 to 10 minutes.) A clock at the top of the screen keeps track of the time from 9:00 to 5:00.

A sign also appears indicating "customers served." When 5:00 comes around, the shop automatically closes and the student returns to the mall. Encourage students to take note of their scores and try to work even faster to serve more customers the next time they work in that shop.

The All Shops Game

In the All Shops game, students serve as many customers as possible in all 10 shops.

When students begin the game, there are customers waiting to be served in many of the shops. All shops are open for business in the All Shops game, and more customers continue to arrive as students work. Encourage students to work as quickly as possible because when there are 10 customers in a shop, they grow impatient and all 10 leave. The game ends when a total of 50 customers have left the mall.

To begin working, follow the instructions in the Choosing a Game section on page 9 to enter one of the shops. Once inside a shop, the "customers waiting" sign appears at the top of the screen displaying the number of customers in this shop. No additional customers enter this shop while students are working. When all the customers are correctly served, the "customers waiting" number reaches zero and students automatically return to the mall.

Remind students that they do not have to serve all the customers in a shop. While they are serving customers in one shop, customers are lining up in others. It is a good idea to serve a few customers in one shop, then enter another shop to serve a few customers there. This way students avoid losing 10 customers from one store while they are serving customers in another. Students can leave a store and return to the mall at any time by pressing Esc. They can then enter a different shop to serve more customers.

As customers are served in each shop, their orders become more difficult. Students can leave a shop without serving a particular customer, but when they return, the demands of the new customers will stay at the same level of difficulty.

Tell students to keep track of the two signs that appear at the top of the mall:

Customers Served This shows the total number of customers served in all of the shops. When the game ends, this number is the final score.

Customers Lost This shows the number of impatient customers that have left the mall because they waited in line too long without being served.

Remember, a shop becomes overcrowded when the tenth customer arrives. At that point all 10 customers lose their patience, and leave the shop. Ten customers are added to the "customers lost" number. Tell students not to worry. This is bound to happen fairly frequently. In the meantime, there are many more customers needing help at the other nine shops, and new ones will soon start lining up again in the shop that has just emptied. Tell students to work as quickly as they can to serve as many customers as possible before the end of the game.

How the Game Ends

At some point, no matter how good students are, the "customers lost" number will eventually reach 50. This signals the end of the game. The score screen shows how many customers have been served at each of the 10 shops.

Students who do exceptional work may be able to add their names to the list of Top Employees. The 10 highest scores make this list.

Tips for Playing the All Shops Game

Here are some playing strategies for your students to follow:

1. Head for the most crowded shops first. The more customers waiting on line, the closer the shop is to being overcrowded.
2. Try to avoid taking long walks from one end of the mall to the other. Walking from shop to shop uses up precious time—time that could be spent working! So, unless there are large crowds elsewhere, try to work in nearby shops first.
3. Serve at least a few of the customers in each shop, even if you think some shops are more difficult than others. Remember, in all the shops, the first customers are the easiest ones to serve. Even if you serve only three customers, you will delay overcrowding. This will give you more time to help in the other shops.
4. Just because a shop overcrowds doesn't mean that you can't work there again. More customers will arrive, eager to be served.
5. A shop can never overcrowd while you're working there, so you can let a shop line build up to nine customers. Then if you enter that shop before the tenth customer arrives, you can stay and work without worrying that it will overcrowd while you're there.
6. As you play the All Shops game, write down the names of the shops that give you trouble. Then switch to the One Shop game, and enter each of those shops for practice. After a few practice sessions, try the All Shops game again. You should find that your score improves.

Keys to Know

Use the following keys for both the One Shop and All Shops games to move your figure through the mall and solve the problems in each shop.

Moving Around the Mall

To **walk**, press ← or → to walk left and right.

NOTE TO APPLE II PLUS USERS: Press J to walk left, and K to walk right.

To **ride the elevator**, walk the figure over to the elevator platform that appears on the right side of the mall, then press ↑ or ↓ to ride the elevator up or down.

NOTE TO APPLE II PLUS USERS: Press I to ride up and M to ride down.

To **enter a shop**, walk the figure to the front of the shop and press the Space Bar. The figure will enter the shop.

Working in a Shop

Read Instructions Before beginning work in a shop, press I.

Start working inside a shop Press S.

Enter a number Type the number.

Erase a number Press the Delete key.

Change a number Type the new number over the old number.

Move the blinking arrow Use the arrow keys.

Serve a customer After you solve a problem, press Return to serve the customer. If the answer is correct, the next customer will step up to be served. If not, you'll get to try again.

Leave a shop Press Esc.

Quit the game Press Esc while the figure is standing in the mall.

Switch shop setting Press Esc when the figure is in the mall. The program will display your choices at the bottom of the screen.

Close a shop Move the figure in front of the shop you want to close and press Ctrl-O. A "closed" sign will appear in the window.

Open a closed shop Move the figure in front of that shop and press Ctrl-O again. The "closed" sign will disappear from the shop window.

Turn the sound on or off Press Ctrl-S at any time to turn the sound off. Press Ctrl-S again to turn the sound back on.

View the list of Top Ten Employees When the figure is standing in the mall, press Ctrl-V.

Clear the list of Top Ten Employees When the figure is standing in the mall, press Ctrl-C.

TEACHING GUIDE

This Teaching Guide contains information on using *Math Shop Jr.* with your students, a list of the shops and the skills they exercise, and a shop-by-shop introduction to the stores in the *Math Shop Jr.* Mall. Use this information to familiarize yourself with the program. (You will find similar information for your students in the Student Pages section of this handbook.)

Using *Math Shop Jr.* in Your Classroom

This section answers some of the questions that teachers have asked about *Math Shop Jr.*

Is there any required order for working in the shops?

There is no set sequence for using the *Math Shop Jr.* program. Each student can use any or all of the shops that meet your curriculum goals, in any order. In general, the shops on the first floor cover the more elementary skills, and the shops on the upper two floors cover more complex concepts. On the first floor students draw on their knowledge of addition and subtraction. On the second floor, students also practice working with money and use their knowledge of odd and even numbers. On the third floor, students work with ranges, multiplication, finding an area in square feet, and time. The List of Shops and Skills on page 15 gives a more detailed picture of the skills covered in each of the shops.

How much time should I allow for Math Shop Jr.*?*

The One Shop game without the clock is the most flexible game. Your students can work as long as they like, or you can give them a time limit. You can instruct them to serve a certain number of customers in a store before quitting, and you can tailor the assignment according to available computer time and the needs of each student.

If you want to limit each student's time with *Math Shop Jr.*, or if you'd like to provide a motivation for working as quickly as possible, turn on the clock in the One Shop game. Work in each shop will proceed from 9:00 to 5:00. This "work day" is actually from seven to ten minutes long, depending on the shop. You may want to give assignments of two days of work in one shop, one day in two different shops, or some other combination of days and shops.

The length of play for the All Shops game depends totally on the speed at which students work. The more quickly and accurately the students solve the problems, the longer they get to play the game. Also, the more stores they're familiar with, the better their score will be, and the longer they will get to play. For most students, allow from 15 to 25 minutes, depending on their levels of expertise.

What's the best way to work in the Math Shop Jr. *shops?*

To take full advantage of *Math Shop Jr.*, it is important that students not always try to calculate their final answers before responding to a problem. Encourage them to make reasonable guesses and see what happens, especially when they are stuck on difficult problems. Students can learn about the nature of the problem by studying how their wrong answers effect the different factors involved in the problem.

Encourage students to write numbers on paper if it helps them work through the problems. Some *Math Shop Jr.* problems require mental arithmetic. Some students may need to work on paper.

When are students ready for the All Shops game?

Students do not have to master the skills needed for all 10 shops to do well at the All Shops game. For the most part, students can play the All Shops game if they can work well in six or seven of the *Math Shop Jr.* shops. In the All Shops game, students should be advised to move to a new shop if they find the problems in a store becoming too time-consuming and difficult. As long as they work quickly, they can work in only six or seven of the stores and stay in the game for a reasonable length of time. Finally, you can close any of the shops that are too difficult for students. No customers will enter those stores and students will only solve problems in the stores that are at their level of understanding.

NOTE: To close a shop in the One Shop Game or All Shops game, move the figure in front of the shop you want to close and press Ctrl-O. The "closed" sign will appear in the window. To open a shop that has been closed, move the figure in front of that shop and press Ctrl-O again. The "closed" sign will disappear from the shop window.

Can students work together?

In the One Shop game, two students can work very well together, coming up with strategies to solve the problems or to beat the clock. This is especially true when students are just getting to know the game. The All Shops game, on the other hand, is best played individually.

LIST OF SHOPS AND SKILLS

Candle Shop	Finding a missing addend Addition and subtraction
Flower Shop	Addition and subtraction
Yo-yo Shop	Addition and subtraction
Ruler Shop	Identifying odd and even numbers Addition and subtraction
Bank	Identifying the values of coins Addition and subtraction
Spider Shop	Addition and subtraction
Taxi Company	Reading a digital clock Adding and subtracting hours and minutes
Rug Shop	Area Multiplication and division
Gizmo Shop	Multiplication and division
Bead Shop	Mathematical estimation Visual estimation Addition and subtraction

This section is designed to help you become familiar with the *Math Shop Jr.* shops and to help you use the program effectively with your students. You will find a description for each shop, instructions for workng in the shop, and an activity or two for use in your classroom.

The Candle Shop

Description

In this shop, you decide what number to add to a given number to equal a given sum. The skills practiced are:

- Finding a missing addend
- Addition
- Subtraction

How to Work in the Candle Shop

Customers place their orders in the Order box at the top of the screen. There are two boxes on the screen. One box contains a given number of candles. The second box is empty.

You decide how many additional candles to put in the empty box so that the total of the two boxes equals the customer's order.

To do this:

1. Enter the number of candles in the second box. The total number of candles in both boxes appears in the Total box. This number should match the customer's order.
2. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store?

After the first few customers, two full boxes of candles will appear. You decide how many additional candles to put in an empty third box. The maximum customer order will be 99 candles.

Activity

This flash card game may help prepare students to work in the Candle Shop. Begin by creating two sets of flash cards. Each card should contain a single number between one and 20. Divide the class into two teams and give each team a shuffled set of cards, face down. For each round, the team captains hold up a card. The larger of the two displayed numbers is the sum. The team with the smaller number decides what number should be added to it to equal the sum. Each correct answer scores a point. The team with the most correct answers wins the game.

The Flower Shop

Description

In this shop, you choose one number from each of two given lists to equal a given sum. The skills practiced are:

- Addition
- Subtraction

How to Work in the Flower Shop

In this shop, flowers are arranged in two rows. The first row contains bunches of 2, 4, and 7 flowers. The second row contains bunches of 1, 4, and 6 flowers.

Customers place their orders in the Order box at the top of the screen. You fill the order by adding one bunch of flowers from the first row to one bunch from the second row.

To do this:

1. Enter a number from the first row in the First Row box. Use the arrow keys to move to the next box.
2. Enter a number from the second row in the Second Row box. The total number of flowers appears in the Total box. This number should match the customer's order.
3. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, a third row of flowers will appear containing bunches of 3, 5, and 6 flowers. You fill customers' orders by adding one bunch of flowers from each of the three rows.

Activity

To help students understand this shop, you might create your own Flower Shop by making flowers out of pipe cleaners, colored paper, or popsicle sticks. For younger students you can begin by creating two piles of flowers, and instructing each student to fill a flower order by choosing as many flowers as they like from each pile.

Then put the flowers into bunches using rubber bands, plastic twists, or tin cans. Organize the bunches into two rows as in Flea's Flower Shop. Ask students to fill flower orders by adding one bunch of flowers from the first row with one bunch from the second row.

The Yo-yo Shop

Description

In this shop, you choose one to three numbers from a given set to equal a given sum. The skills practiced are:

- Addition
- Subtraction

How to Work in the Yo-yo Shop

You are given three boxes containing 1, 2, and 4 yo-yos. Customers place their orders in the Order box at the top of the screen. You decide what combination of boxes will fill this order.

To do this:

1. Use the arrow keys to move from box to box. For each box that you want to use to fill the order, type **Y** for Yes. For each box that you don't want to use, type **N** for No. The sum of the boxes for which you typed **Y** appears in the Total box. This number should match the customer's order.
2. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, two additional boxes will appear containing 6 and 7 yo-yos. Later, a sixth box will be added containing 8 yo-yos.

Activity

Organize a bingo game to teach adding with two and three numbers. Create bingo cards using any combination of digits between 3 and 30. Use colored paper squares for markers. Create a set of flash cards containing single numbers between one and 10. Have one student sit in front of the classroom and hold up sets of two or three cards. Write the numbers on the board. Students add the numbers together. If the sum matches a number on their bingo card, they can place a marker on that square. Students can do the addition in their heads or use scratch paper.

The Ruler Shop

Description

In this shop, you choose two odd numbers or two even numbers from a given set to equal a given sum. The skills practiced are:

- Identifying odd and even numbers
- Addition
- Subtraction

How to Work in the Ruler Shop

Students are given an unlimited number of boxes containing 1, 2, 3, 4, 5, and 6 rulers. Customers' orders appear in the Order box at the top of the screen. Customers also state whether they want the order filled using all odd or all even-numbered packages.

You fill the order by selecting two odd or two even-numbered packages.

To do this:

1. Type the number of the first package in the first input box at the right side of the screen. Use the arrow keys to move to the next input box.
2. Type the number of the second package in the second input box. The total number of rulers appears in the Total box. This number should match the customer's order.
3. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, you will have three more package sizes to choose from. Still later, you will be able to choose up to three packages.

Activities

1. Make sure students understand the concept of odd and even numbers. To illustrate this, choose five students. Group four of them together and explain this is an even number. Add the fifth student and show how the number of students is now odd. Then ask students to look around the classroom and point out objects that contain odd and even numbers—chair legs (even), fingers (odd), etc.
2. You can help students understand odd and even numbers by playing a variation on a traditional hand game.

   Pair students. Ask each pair to face each other with their hands in fists. At the count of three, both students display from one to 10 fingers, shouting either "odd!" or "even!" They can use one or two hands, and any combination of fingers. Students add up the total of displayed fingers. If the sum is an odd number, the player who shouted "odd," gets one point. If it is an even number, the player who shouted "even" gets one point. In a tie, both players get a point.

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COLUMBIA HEIGHTS, MINN.

The Bank

Description

In the bank, you decide how many quarters, dimes, nickels, and pennies to give to customers making savings withdrawals. The skills practiced are:

- Adding and subtracting coins
- Identifying the value of coins
- Calculating the value of sets of coins

How to Work in the Bank

The amount of the customer's withdrawal appears on the right side of the screen. You decide what combination of coins equals this amount. To begin with, any combination of coins is acceptable.

To do this:

1. Next to each coin, type the number of that coin you need. Use the arrow keys to move from coin to coin. Be sure to type the number of coins, not the total value. For instance, if you wanted two dimes, you would type **2**, not 20.

   The total value of the coins you have chosen appears in the Total box. This number should match the customer's withdrawal request.

2. When you think you have the correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, you will fill withdrawal requests using the fewest possible coins.

Activities

1. You may want to create your own bank. Make coins out of cardboard, or use poker chips or play money. Have students practice determining the correct number of coins for specified amounts of money.

2. Divide your class into two teams. Assign each player a value of 1, 5, 10, or 25 cents. Write these values on a badges for players to pin to their clothing. Both teams should have the same number of "coins." Players take turns being team captains. Write a sum of money on the chalkboard and have the two captains choose the players on their teams who add together to equal the sum. Score one point for the team that makes the correct change the fastest, and one point for the team that uses the fewest players.

The Spider Shop

Description

In this shop, you decide what number to subtract from a given number to equal a given number. The skills practiced are:

- Addition
- Subtraction

How to Work in the Spider Shop

You are given three packages containing 8, 15, and 25 plastic spiders. Customers place their orders in the Order box at the top of the screen.

To fill this order, choose one of the three packages and remove a number of spiders from it so that the remaining spiders equal the customer's order.

To do this:

1. Type the package size you want (8, 15, or 25) in the box in the lower left-hand corner of the store. Use the arrow keys to move to the next input box.
2. Type the number of spiders you want to remove from that package in the arrow. The number of remaining spiders appears in the Total box. This number should match the customer's order.
3. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, you will have three additional packages to choose from. These packages will contain 37, 52, and 75 spiders.

Activities

1. For younger students you may want to introduce the concept of subtraction by drawing a row of circles on the chalkboard or on worksheets. Then ask for a number of circles that is less than the number you drew. Tell students to get that number by crossing out the extra circles. You can also do this exercise with chips or checkers, having students work at their seats or using an overhead projector.
2. Create your own Spider Shop. Make spiders out of cardboard or clay. Place a certain number of spiders in a shoe box or other container. Then ask students for an amount of spiders less than what is contained in the package. Have them count the spiders they remove, as well as the ones left in the box.

The Taxi Company

Description

In the Taxi Company, you schedule taxis to get customers to their destinations on time. The skills practiced are:

- Reading a digital clock
- Adding and subtracting hours and minutes

How to Work in the Taxi Company

In this shop, the Taxi Request form indicates where a customer wants to go and what time he wants to arrive. The amount of time it takes to get to the customer's destination appears in the box labeled "Travel Time." You decide what time the taxi should leave in order to get to the destination on time. To begin with, all times are in 30-minute intervals.

To do this:

1. Type the departure time in the box labeled "Leave." The actual arrival time appears in the box labeled "Arrive." This time should match the customer's requested arrival time.
2. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, the departure and arrival times will be on the quarter hour. Later, the times will be in smaller intervals.

Activity

To help students understand the concepts of distance and time, involve the class in "time detective stories." To begin, give each student paper and pencil to use to crack the case. Then follow these steps:

1. Tell the class when and where the suspect was last observed.
   (Example: "Mr. Jones was seen at the pizza parlor at 2:45.")
2. Tell the class what time the crime was committed.
   ("The bank was robbed at 3 o'clock.")
3. Tell the class how long it takes to travel from A to B.
   ("It takes 20 minutes to travel from the pizza parlor to the bank.")
4. Ask the class if the suspect had time to commit the crime.
   ("Mr. Jones is innocent because he couldn't have reached the bank before 3:05.")

Repeat these steps with different suspects, locations, and times.

The Rug Shop

Description

In this shop, customers order rugs by the square foot. For each problem, the width of the rug is given. You decide what the length of the rug needs to be to fill each customer's order. The skills practiced are:

- Area
- Multiplication
- Division

How to Work in the Rug Shop

Customers order rugs of specific areas. Their orders appear in the Order box at the top of the screen. The width of the rug appears in the Width box. Fill the order by deciding what length the rug should be to equal the customer's order.

To do this:

1. Enter the length in the Length box. The total area appears in the Total box. This number should match the customer's order.
2. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, not only will the customer request a rug of a particular area, but you will also decide on both length and width with a given minimum for each.

Activity

Give each student a number of one-inch squares made out of cardboard or colored paper. Write a number representing the area of a rectangle on the board. Have each student create a rectangle with that area, making a note of the length and width. Then ask students to create another rectangle with the same area, but a different length and width. See how many different rectangles with that area each student can find.

This exercise can also be done using an overhead projector. Have one student create a rectangle with a given area. Have students take turns arranging new rectangles with the same area on the projector.

The Gizmo Shop

Description

In this shop, you decide what number to multiply a given number by to equal a given sum. The skills practiced are:

- Multiplication
- Division

How to Work in the Gizmo Shop

Customers' orders appear in the Order box at the top of the screen. For each customer, you are given a different size box of gizmos. The number of gizmos in the box appears in the Box Size label. You decide how many boxes are needed to fill the customer's order.

To do this:

1. Type the number of boxes you want to use in the "number of boxes" sign. The total number of gizmos appears in the Total box. This number should match the customer's order.
2. When you think you have a correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, you will have two different boxes containing 3 and 4 gizmos to choose from. You choose one size and decide how many boxes of that size will equal the customer's order. Later, there will be two more boxes containing 5 and 7 gizmos.

Activity

Draw a giant birthday cake on the chalkboard, and a number of boxes of birthday candles, each on a separate piece of construction paper. There should be several different-sized boxes of candles, and several of each size should be available. Divide the class into teams. Write a number on the board to represent the number of candles needed on the cake and have one team decide what size box to use. Then have that team select as many construction paper boxes of candles as they need and send one student to the board with each box. The other team(s) can check the multiplication and tell them if they are correct.

The Bead Shop

Description

In this shop, you are given a range of numbers and must find two numbers whose sum falls within that range. The skills practiced are:

- Mathematical estimation
- Visual estimation
- Addition
- Subtraction

How to Work in the Bead Shop

Customers' minimum and maximum bead requirements appear in the Order box at the top of the screen. You are given an unlimited number of packages containing 5, 10, 20 and 40 beads. You add two different packages of beads together to get a sum that falls within a customer's range.

The customer's minimum and maximum requirements and the total of the packages you select are represented on a bar graph. You can judge whether the sum of the packages you have chosen falls within the customer's range by comparing the bars on the graph or by comparing the number in the Total box with the numbers in the Order box.

To do this:

1. Type the numbers of the packages you want to use in the boxes at the top of the screen. Use the arrow keys to move from box to box. The total number of beads appears in the Total box. This number should fall within the customer's range.
2. When you think you have the correct answer, press Return or Enter to serve the customer.

What Else Is in Store

After the first few customers, five different packages of beads will appear containing 5, 8, 12, 18, and 25 beads. Later, two additional packages of 35 and 48 beads will be added.

Activity

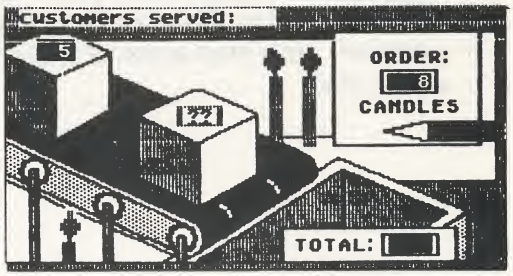
To prepare students for work in the Bead Shop, attach a measuring tape or yardstick to a wall or the chalkboard. Cut paper strips that measure 5 inches, 10 inches, and 20 inches and place them in three piles. You may want to use a different color paper for each length. Mark two points on the measuring tape or yardstick, such as 16 inches and 33 inches. Have students select two strips from the piles and place them end to end on the measuring line so that the sum of the lengths falls between the two points you have marked. When all of the possible combinations have been found, mark two new points on the measuring tape or ruler. This exercise can be done with paper strips of different lengths. It can also be organized as a game where each correct answer earns a point and two or more teams compete for the greatest number of points.

STUDENT PAGES

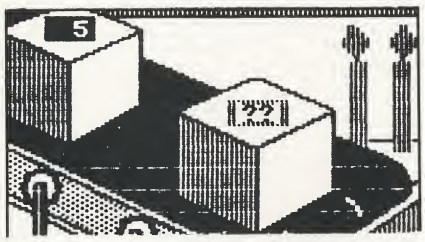
This section contains one page of information for each of the *Math Shop Jr.* shops. This information includes illustrated instructions for working in the shop and a sample problem. You may want to photocopy these pages so that each student has a copy to work with.

The Candle Shop

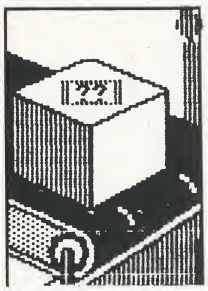
Welcome to Lydia's Candle Shop.
Work here and watch your math skills shine!



This is the customer's candle order.



There is one full box of candles and one empty box. How many candles do you need to put in the empty box so the total of the two boxes equals the customer's order?

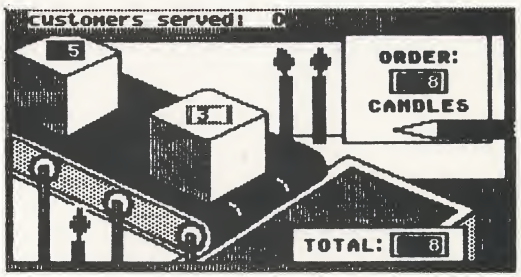


Type the number of candles you want to put in the empty box here.

The total number of candles in both boxes will appear in the Total box. This number should match the customer's order. If it doesn't match, try the problem again!

When you think you have the right number of candles, press Return or Enter.

In this problem, the customer ordered 8 candles. The first box has 5 candles in it. Fill the order by putting 3 candles in the empty box. (5 + 3 = 8)



Later, you will have two full boxes of candles and one empty box.

Good luck!

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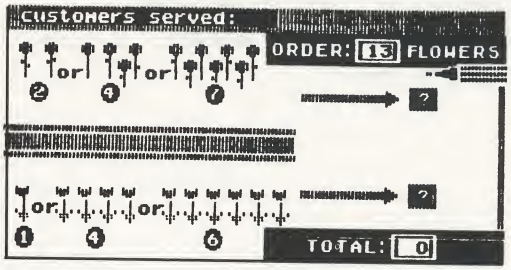
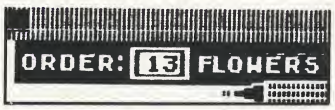
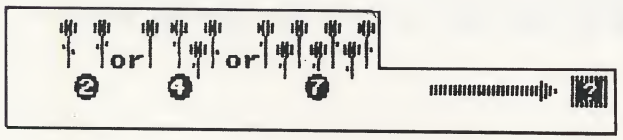
The Flower Shop

This is Flea's Flower Shop.
Work here and watch your math skills blossom!

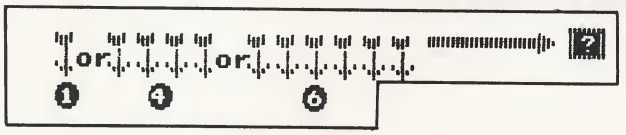




This is the customer's flower order.



There are two rows of flowers. Pick one bunch from the first row. Type the number of the bunch in the box at the end of the row. Use the arrow keys to go to the next box.

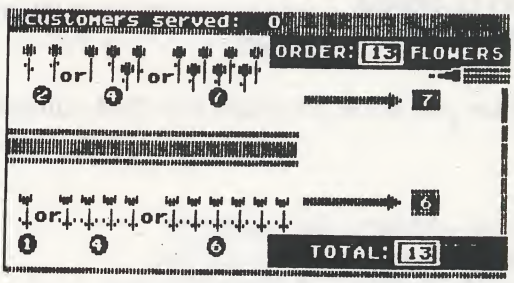


Pick one bunch from the second row. Type the number of the bunch in the box at the end of the row.

The total number of flowers will appear in the Total box. Does this number match the customer's order? If it doesn't match, try the problem again!

When you think you have the right number of flowers, press Return or Enter.

In this problem, the customer ordered 13 flowers. You fill the order by adding 7 flowers from the first row and 6 flowers from the second row. (7 + 6 = 13)



Later, a third row of flowers will appear. Fill orders by adding one bunch of flowers from each of the three rows.

Good luck!

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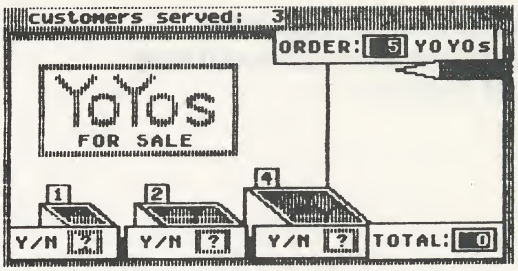
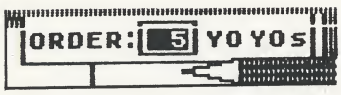
The Yo-yo Shop

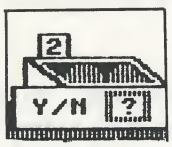
Welcome to Lila's Yo-yo Shop. Workers in this store are no yo-yos in math!



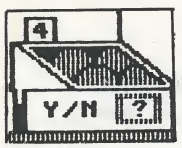


This is the customer's yo-yo order.

There are three boxes of yo-yos to choose from. Which packages do you need to give to the customer so that they have the right number of yo-yos?



Type a **Y** under each box that you want to use.



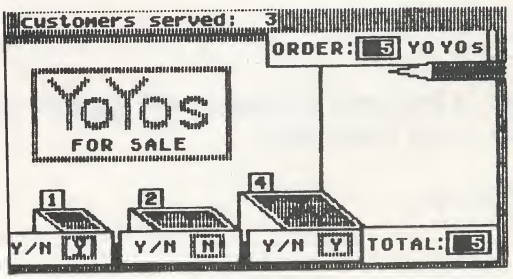
Type an **N** under each box that you don't want to use.

Use the arrow keys to move from box to box.

The total number of yo-yos will appear in the Total box. This number should match the customer's order. If it doesn't match, try the problem again!

When you think you have the right number of yo-yos, press Return or Enter.

In this problem, the customer ordered 5 yo-yos. You fill the order by typing a **Y** under the box of 1 yo-yo and the box of 4 yo-yos, and an **N** under the box of 3 yo-yos. (1 + 4 = 5)



Soon, two more boxes of yo-yos will appear, and you will have five boxes to choose from. Later, a sixth box will be added.

Good luck!

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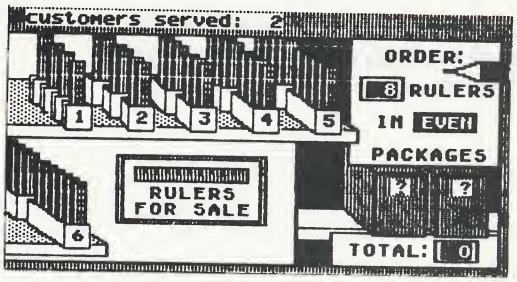
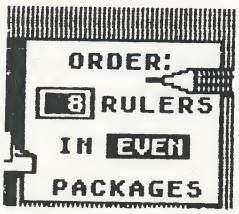
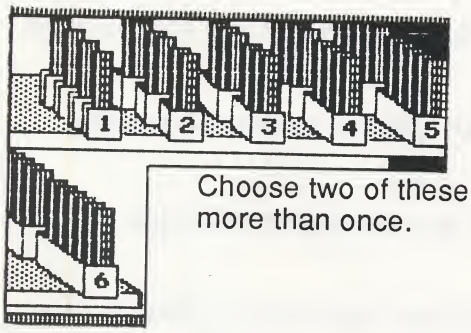
The Ruler Shop

Welcome to Golden Rulers.
Work here to see how your math skills measure up.

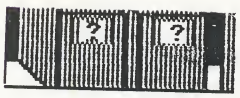




This is the customer's ruler order. It says how many rulers the customer wants. The order also says that the rulers should be in odd or even-sized packages.



Choose two of these boxes of rulers. You can use the same size box more than once.

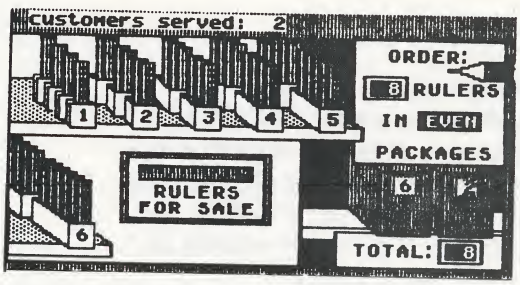


Type the number for each box here.

The total amount of rulers will appear in the Total box. This total should match the number of rulers the customer ordered. If the numbers don't match, or if you used the wrong kind of package, try again!

When you think you have a correct answer, press Return or Enter.

In this problem, the customer ordered 8 rulers in even-sized packages. You can fill the order by choosing the package of 2 and the package of 6. (2 and 6 are both even numbers, and 2 + 6 = 8)



Can you think of another way to solve this problem correctly?

After the first few customers, you will have more packages to choose from. Later, you will have to pick three at a time, instead of two.

Good luck!

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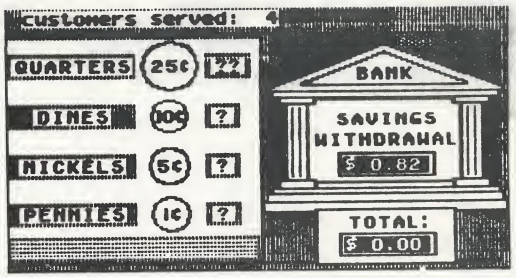
The Bank

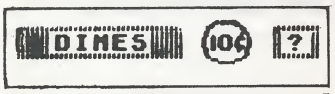
This is the Small Change Bank.
Work here to see your math skills
earn interest!



Customers come to the bank to take money out of their savings accounts. This tells you how much money a customer wants.

There are pennies, nickels, dimes, and quarters in the bank. How many of each coin do you need to give to each customer?

Next to the picture of a quarter, type the number of quarters you want to use.



Next to the picture of a dime, type the number of dimes you want to use.

Next to the picture of a nickel, type the number of nickels you want to use.

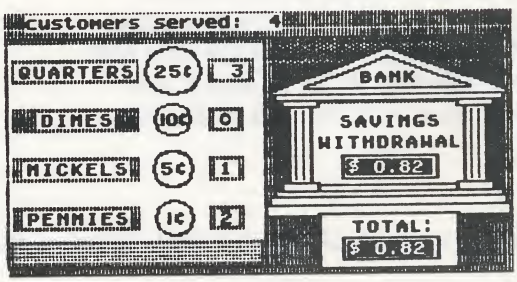
Next to the picture of a penny, type the number of pennies you want to use.

Use the arrow keys to move from coin to coin.

The total amount of money will appear in the Total box. This number should match the customer's withdrawal. If it doesn't match, try the problem again!

When you think you have the right amount of money, press Return or Enter.

In this problem, the customer asked for 82 cents. You choose 3 quarters, 0 dimes, 1 nickel, and 2 pennies. (3 quarters equals 75¢; 0 dimes equals 0¢; 1 nickel equals 5¢; 2 pennies equals 2¢. 75 + 0 + 5 + 2 = 82.)



After you have worked in the Bank for a while, you will have to give customers their money using the fewest possible coins.

Good luck!

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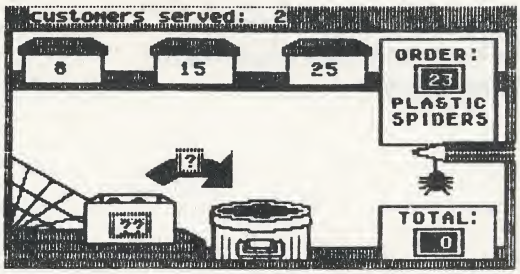
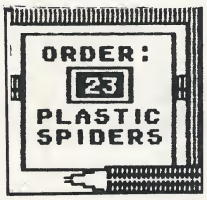
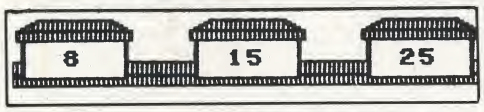
The Spider Shop

Welcome to Itsy Bitsy Spiders. Work here to solve some sticky subtraction problems.

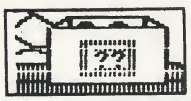




This is the customer's order for toy spiders.



There are three boxes of spiders on the shelf. The number on each box says how many spiders are in it.



Choose one of the boxes and type its number here.

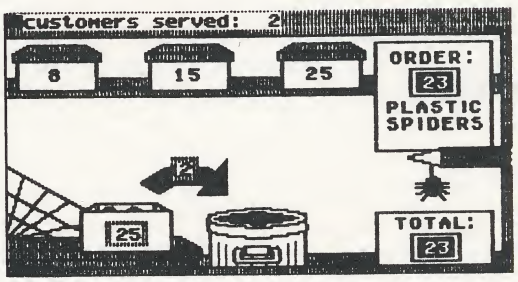
Type the number of spiders you need to take out of the box here.

Use the arrow keys to move around the shop.

The number of spiders remaining in the box will appear in the Total Box. This number should match the customer's order. If it doesn't match, try the problem again!

When you think you have the right number of spiders, press Return or Enter.

In this problem, the customer ordered 23 spiders. You choose the box that has 25 spiders, and take out 2 spiders. (25 - 2 = 23)



Later, three new boxes will appear.

Good luck!

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The Taxi Company

Welcome to Dallas Taxis.
Work here and take your math skills for a ride!

In this shop customers will tell you where they want to go and when they want to get there.

This tells you how long the trip will take. What time should the taxi leave to get to the destination on time?

Type the time the taxi should leave here.

This tells you what time the taxi will arrive if it leaves at the time you typed in. Does this time match the time the customer wants to arrive? If not, try again.

When you think you have the correct departure time, press Return or Enter.

In this problem, the customer wants to arrive at San Wiches at 4:00. It takes 3 hours to get there. You type 1:00 in the Leave box. (1:00 + 3:00 = 4:00)

Good Luck!

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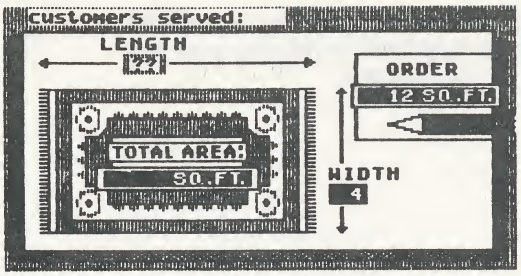
The Rug Shop

Welcome to Rugs to Riches. Work here to improve your wall-to-wall math skills.



This is the customer's rug order.

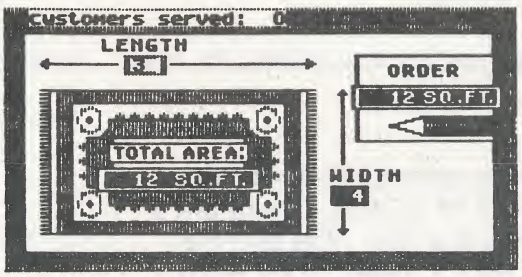
The width of the rug will appear in the Width box.

Type the number for the length of the rug here.

The total area will appear in the Total box. This number should match the customer's order. If it doesn't match, try again!

When you think you have a correct answer, press Return or Enter.

In this problem, the customer ordered a 12 square foot rug. The width of the rug is 4 feet. You type in 3 for the length. (4 feet x 3 feet = 12 square feet)



Later, you will decide on both the length and the width. Each number will have to be larger than a given minimum.

Good luck!

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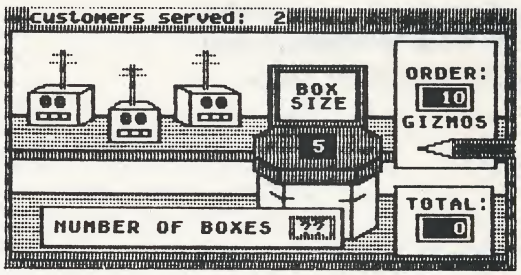
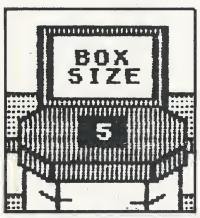
The Gizmo Shop

Welcome to Gizmos Galore. Work here to see how inventive you are with multiplication.



This is the customer's gizmo order.



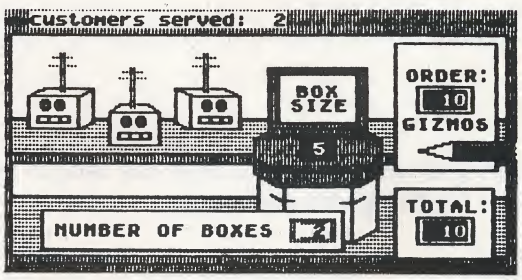
Look at the number of gizmos in this package. How many packages do you need to give the customer so that she has the right number of gizmos?

Type the number of packages you want to use here.

The total number of gizmos will appear in the Total box. This number should match the customer's order. If it doesn't match, try the problem again!

When you think you have the right number of gizmos, press Return or Enter.

In this problem, the customer ordered 15 gizmos. There are 5 gizmos in a box. You give the customer 3 boxes. (5 x 3 = 15)



After the first few customers, you will have two different boxes to choose from. First you choose the size of the box you want and then you decide how many boxes of that size to use. Later, there will be four boxes to choose from.

Good luck!

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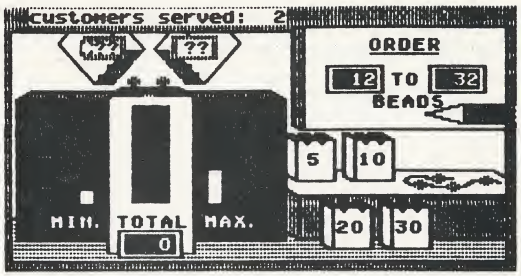
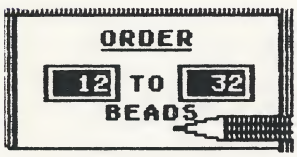
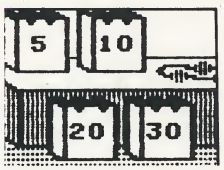
The Bead Shop

Welcome to Bumble Beads. Work here to get a bead on your math skills.

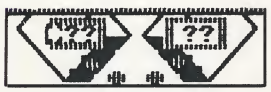




This is the customer's bead order. The customer wants at least a certain number of beads, and not more than another number.



There are four packages of beads to choose from. The number on each package says how many beads are in it.

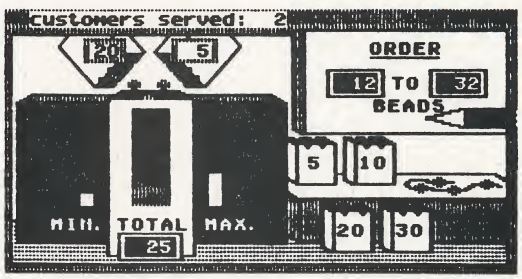


Pick two of the packages and type their numbers here.

The total number of beads will appear in the Total box. This number should fall within the customer's range. If it doesn't, try the problem again!

When you think you have a correct answer, press Return or Enter.

In this problem, the customer ordered 12 to 32 beads. You can fill the order by adding the box of 5 beads to the box of 20 beads. (5 + 20 = 25; 25 is greater than 12 and less than 32.)



Can you think of another way to solve this problem correctly?

Later, five new boxes of beads will appear. Then two more boxes will appear.

Good luck!

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WORKSHEETS

This section contains twenty worksheets which employ the skills used in the *Math Shop Jr.* shops. The worksheets can be used as warmup exercises before using the *Math Shop Jr.* Program, or as reinforcement exercises after working in the shops.

The following chart show which worksheets correspond to which shops.

Shop	Worksheet numbers
Candles	1, 2
Flowers	3, 4
Yo-yos	5, 6
Rulers	7, 8
Bank	9, 10
Spiders	11, 12
Taxi	13, 14
Rugs	15, 16
Gizmos	17, 18
Beads	19, 20

MATH SHOP JR.
Worksheet 1 Name:

At Robin's Ring Shop, rings are made of either metal or plastic. Tell each customer which kind of ring costs more and by how much.

Here's what the different kinds of rings cost:

	Metal	Plastic	Which costs more?	How much more?
	9 cents	7 cents	Metal	2¢
	12 cents	15 cents	_____	_____
	21 cents	17 cents	_____	_____
	32 cents	34 cents	_____	_____
	43 cents	30 cents	_____	_____
	19 cents	28 cents	_____	_____

Dorothy had 36¢ to spend. She picked a 12¢ ring and a 17¢ ring. How much did she have left?

Thomas had 50¢. He picked out a 21¢ ring and a 17¢ ring. How much did he have left?

Elvira bought the 32¢ ring and the 30¢ ring. She started with 69¢. How much money did she have left?

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MATH SHOP JR.
Worksheet 2

Name:

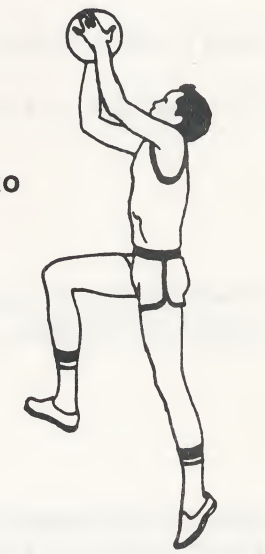
Here are some sports scores. How many points does the team that is behind need to tie the game?

Soccer teams & scores

				Points needed to tie the game
Tigers	6	Blue Sox	0	6
Ravens	11	Rams	7	_____
Seals	8	Chiefs	5	_____
Yanks	4	Turtles	3	_____
Eagles	9	Bears	4	_____
Pals	14	Greens	3	_____

Basketball teams & scores

				Points needed to tie the game
Mallards	56	Whippets	66	_____
Supers	71	Reds	77	_____
Blues	65	Huskies	70	_____
Penguins	44	Skins	45	_____
Bobcats	100	Lions	98	_____



Which basketball team is ahead by the largest amount? _____

Which basketball team is losing by the smallest amount? _____

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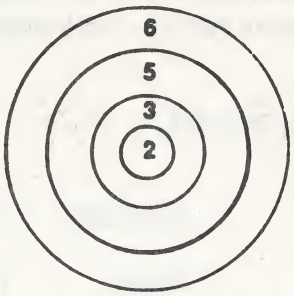
MATH SHOP JR.
Worksheet 3

Name:

Emily's class was shooting darts at this dart board:



Emily got 7 points with 2 darts. She hit 5 and 2. Here are the scores of 3 other students. Each one threw 2 darts. Which numbers did they hit?

Tom: 10 points
5, 5

Daniel: 5 points
_____, _____

Flora: 6 points
_____, _____

The class threw another round of darts. Which numbers did they hit?

Emily: 11 points
_____, _____

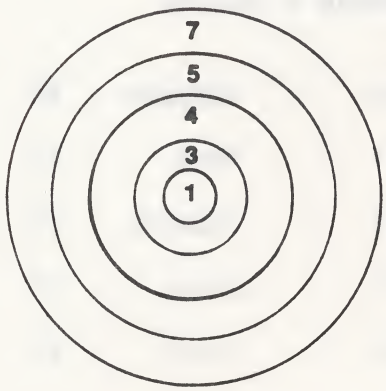
Daniel: 9 points
_____, _____

Tom: 7 points
_____, _____

Who had the highest score? _____

Who had the next highest score? _____

The next day, the students played on a bigger dartboard:



Each student threw three darts. What numbers did they hit?

Jamal: 13 points
_____, _____, _____

Akiko: 17 points
_____, _____, _____

Flora: 19 points
_____, _____, _____

Emily: 11 points
_____, _____, _____

Tim: 12 points
_____, _____, _____

Challenge: Flora threw 4 darts and got 22 points. What numbers did she hit?

_____, _____, _____, _____

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MATH SHOP JR.
Worksheet 4

Name:

Tania has three brothers: Sam is 2 years old, Ted is 5, and Juan is 7.

SAM is 2

TED is 5

JUAN is 7

Jenna also has three brothers: Ivan is 1, Andy is 3, and Jeff is 6.

IVAN is 1

ANDY is 3

JEFF is 6

Sara picks one of Tania's brothers and one of Jenna's brothers and adds their ages together. If she tells you what the sum is, can you say which brothers she picked? (Sometimes there is more than one correct answer.)

Sara's total	Tania's Brother	Age	Jenna's brother	Age
6	Ted	5	Ivan	1
8				
13				
10				
11				
3				

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MATH SHOP JR.
Worksheet 5

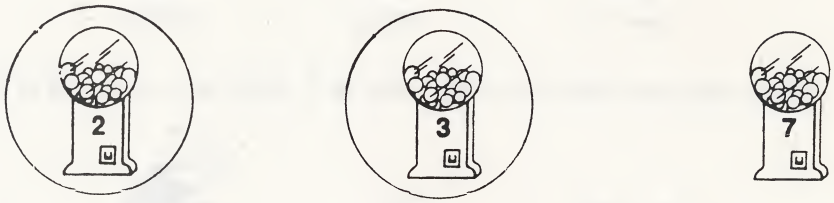
Name:

Pop's Candy Store has 3 gumball machines. The first machine gives 2 gumballs at a time, the second gives 3 at a time, and the third gives 7 at a time.

Circle the machines you want to use to get the correct number of gumballs.

Number to get

5



2

9

7

10

12

3

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MATH SHOP JR.
Worksheet 6

Name:

Pop's Candy Store got some new gumball machines! Each one gives a certain number of gumballs at a time. Circle the machines you want to use to get the correct number of gumballs.

Number to get

See how many combinations of numbers you can make using these machines.

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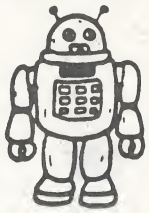
MATH SHOP JR.
Worksheet 7

Name:

In Alice's Dime Shop, Alice only sells items that cost a dime or less.

2¢



6¢

1¢

3¢

9¢

5¢

10¢

7¢

Mr. Odd only buys an item if its price is an odd number.

What are the prices of three items that he can buy for 9¢? 1¢, 3¢, 5¢

What are the prices of two items that he can buy for 16¢? _____, _____

What are the prices of three items that he can buy for 21¢? _____, _____, _____

What are the prices of two items that he can buy for 14¢? _____, _____

What are the prices of two items he can buy for 6¢? _____, _____

Ms. Even only buys items with even prices.

What are the prices of two items that she can buy for 8¢? _____, _____

What are the prices of three items that she can buy for 18¢? _____, _____, _____

What are the prices of two items that she can buy for 12¢? _____, _____

What are the prices of two items she can buy for 16¢ _____, _____

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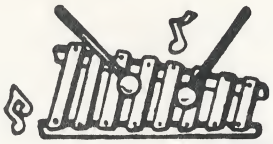
MATH SHOP JR.
Worksheet 8

Name: _____

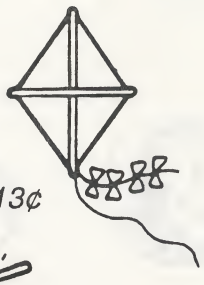
In the Hobby Shop, the prices of different items are:

9¢



12¢

7¢



13¢

2¢

10¢

15¢

Are most of the prices odd or even numbers? _____

When you add the prices of any two even-numbered items, is the sum odd or even? _____

When you add the prices of any two odd-numbered items, is the sum odd or even? _____

Is the cost of any three odd-numbered items odd or even? _____

Is the cost of one odd-numbered item and one even-numbered item odd or even? _____

Mr. Goldberg spent 22¢ for two even-numbered items. What items did he buy? _____ , _____

Ms. Alvarez spent one dollar and got 1¢ back in change. What was the cost of the item she bought? _____

What would it cost to buy all of the even-numbered items? _____

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MATH SHOP JR.
Worksheet 9

Name: .

Today is your first day working at the Supermarket. Your job is to give customers their change. How much money would each customer get if he received these groups of coins?

				Customer's total
1	0	2	1	36¢
1	2	1	3	_____
2	1	1	0	_____
0	4	3	4	_____

Which coins would you use to make each amount of change?

Change for customer				
6¢	1	1	0	0
20¢	_____	_____	_____	_____
12¢	_____	_____	_____	_____
34¢	_____	_____	_____	_____
50¢	_____	_____	_____	_____

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MATH SHOP JR.
Worksheet 10

Name: _____

Today your boss at the Grocery Store said, "Never give more than 5 pennies to one customer!" How many of each of these coins should you use to give each of these customers the right amount of change? Be sure to use the smallest number of coins possible.

Change for customer				
72¢	2	2	0	2
39¢				
91¢				
18¢				
99¢				
57¢				
86¢				
25¢				
47¢				
63¢				

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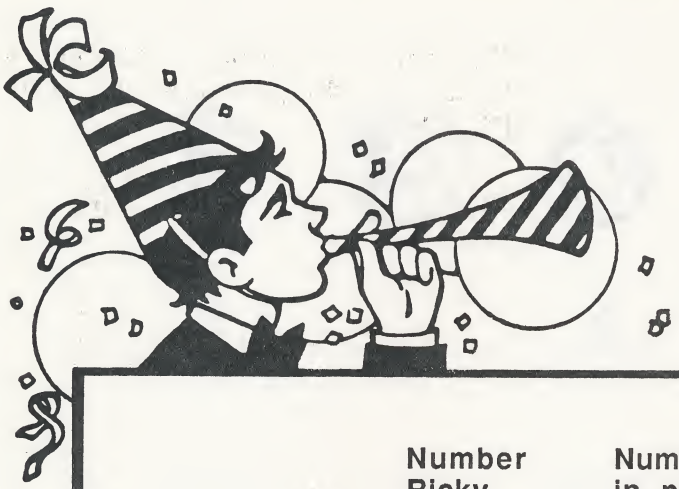
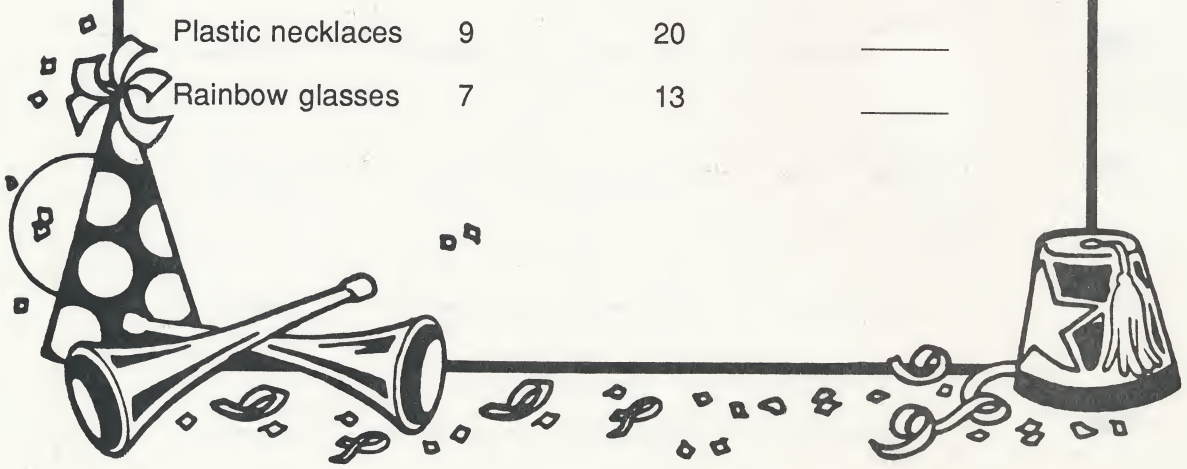
MATH SHOP JR.
Worksheet 11

Name:

Ricky is having a party. He told the store clerk how many of each party favor he wants. You tell the clerk how many to take out of the packages so that the number that Ricky wants is left.



	Number Ricky wants	Number in package	Number to take out
Poppers	6	9	3
Balloons	4	11	
Paper hats	8	10	
Whistles	7	10	
Noise makers	5	8	
Paper plates	8	15	
Funny noses	6	12	
Streamers	20	30	
Plastic necklaces	9	20	
Rainbow glasses	7	13	



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MATH SHOP JR.
Worksheet 12

Name:

Oh no! Extra party guests showed up! Ricky has to buy extra food for his party. Tell the clerk how many items to remove from each package so that the number that is left matches Ricky's order.

	Number Ricky needs	Number in package	Number to take out
Hot Dogs	13	24	11
Cup Cakes	20	50	_____
Ice Cream Pops	15	22	_____
Apples	12	30	_____
Bananas	4	10	_____
Cartons of Milk	7	15	_____
Oranges	22	25	_____
Cans of Popcorn	13	18	_____
Carrots	12	18	_____
Pickles	15	31	_____

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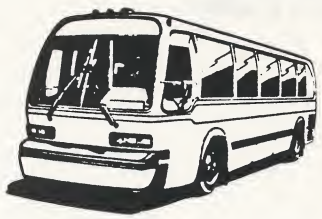
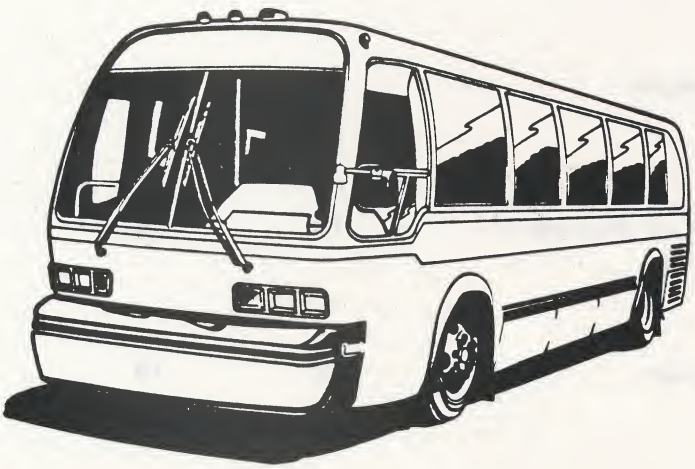
MATH SHOP JR.
Worksheet 13

Name:

You work for the Happy Trails Bus Company. Passengers want to know how long their bus trips will take. The chart below tells you what time each bus leaves and arrives. How long is each trip?



Bus leaves at	Bus arrives at	Hours and Minutes taken
1:00 p.m.	3:30 p.m.	2:30
2:30 p.m.	6:00 p.m.	
10:00 a.m.	12:00 noon	
1:00 p.m.	4:20 p.m.	
2:30 p.m.	5:30 p.m.	
6:45 a.m.	11:00 a.m.	
1:30 p.m.	5:15 p.m.	
12:15 a.m.	7:30 a.m.	
1:25 p.m.	11:25 p.m.	
3:40 a.m.	11:45 a.m.	



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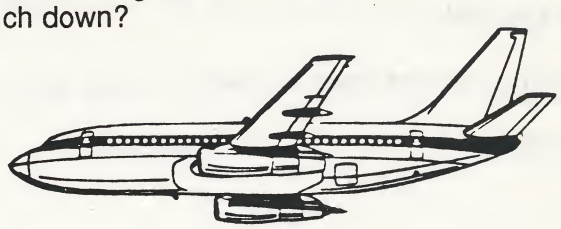
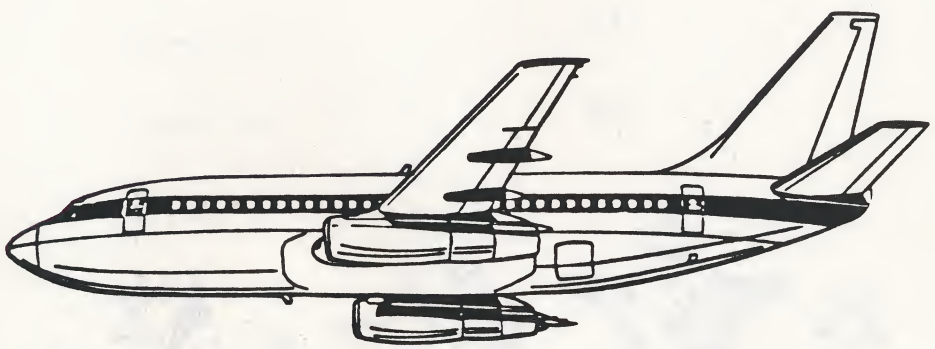
MATH SHOP JR.
Worksheet 14

Name: _____

Airline passengers know what time their afternoon flights take off and how long the trips take. Can you tell them when they will touch down?



Flight leaves at	Hours and minutes taken	Flight arrives at
3:30 p.m.	2:00	5:30 p.m.
6:10 a.m.	5:15	
7:45 a.m.	2:30	
12:00 noon	6:23	
1:00 p.m.	7:15	
2:20 p.m.	3:50	
4:52 p.m.	1:10	
9:27 a.m.	0:45	
1:25 a.m.	4:30	
12:15 p.m.	0:42	



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MATH SHOP JR.
Worksheet 15 Name:

Joe is decorating his room with photos of rock stars. Each photo is one foot long and one foot wide.

How may photos does he need to cover each of these spaces on his wall?

Length	Width	Number of photos
3 ft.	5 ft.	15
2 ft.	6 ft.	_____
4 ft.	8 ft.	_____
7 ft.	7 ft.	_____
2 ft.	4 ft.	_____
12 ft.	10 ft.	_____
3 ft	3 ft.	_____
9 ft.	2 ft.	_____
20 ft.	2 ft.	_____
31 ft.	3 ft.	_____
5 ft.	7 ft.	_____
4 ft.	5 ft.	_____

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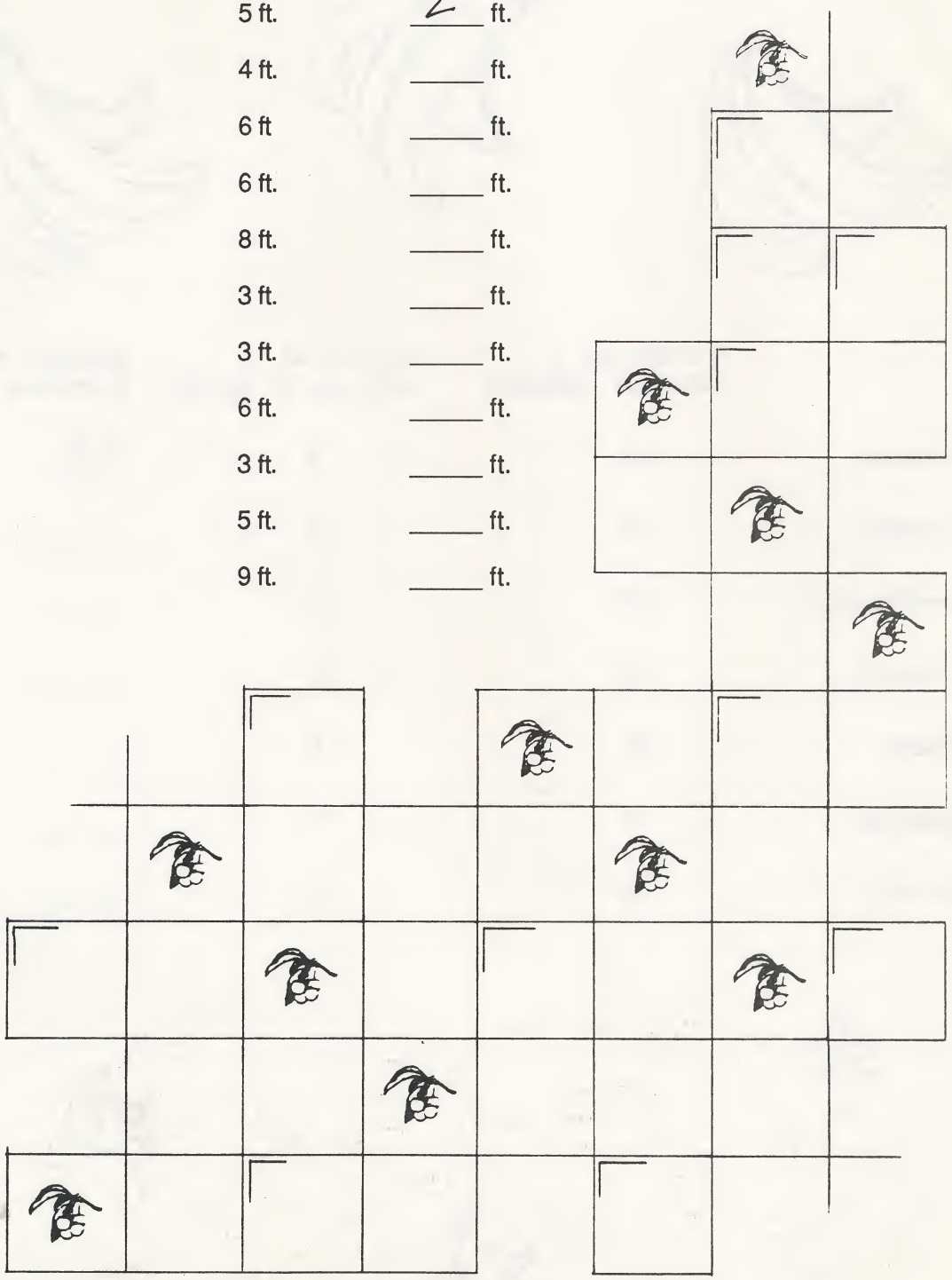
MATH SHOP JR.
Worksheet 16

Name:

Joe wants to lay tiles on the floors in his house. All the tiles are 1 foot by 1 foot. If he gives you the total number of tiles he wants to use and the width of the floor, can you tell him the length of the floor?

Number of tiles to be used	Width	Length
10	5 ft.	2 ft.
8	4 ft.	_____ ft.
30	6 ft	_____ ft.
18	6 ft.	_____ ft.
40	8 ft.	_____ ft.
24	3 ft.	_____ ft.
12	3 ft.	_____ ft.
24	6 ft.	_____ ft.
15	3 ft.	_____ ft.
20	5 ft.	_____ ft.
63	9 ft.	_____ ft.



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MATH SHOP JR.
Worksheet 17

Name:

At Bob's Banana Store, bananas are sold in bunches. Bob has bunches of different sizes each day.

How many bunches will it take to fill each of Ms. Yella's orders?

	Number of bananas ordered	Number of bananas in bunch	Number of bunches
Monday	33	3	11
Tuesday	25	5	_____
Wednesday	28	7	_____
Thursday	40	5	_____
Friday	24	6	_____
Saturday	7	7	_____
Sunday	18	9	_____

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MATH SHOP JR.
Worksheet 18

Name: _____

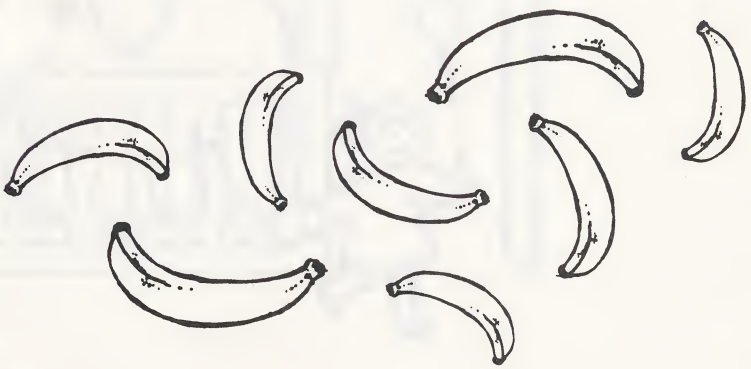
Bertha's Banana Store has bunches of 4, 7, and 9 bananas everyday. Help fill Ms. Peel's banana order. Make sure to use only one bunch size in each order.

4

7

9

	Number of bananas ordered	Number of bananas in bunch	How many bunches?
Monday	14	7	2
Tuesday	18	_____	_____
Wednesday	16	_____	_____
Thursday	27	_____	_____
Friday	24	_____	_____
Saturday	21	_____	_____
Sunday	12	_____	_____



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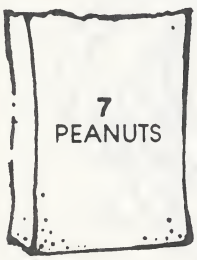
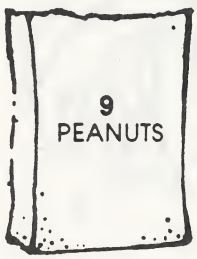
MATH SHOP JR.
Worksheet 19

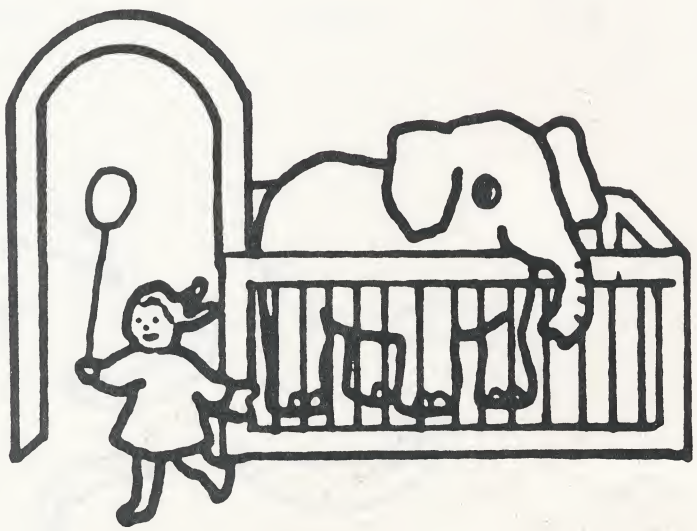
Name:

Feed the elephants at the Zoo! But don't feed them too little or too much. The number on each bag tells you how many peanuts are inside. Choose the size of bag you want and how many bags of that size you need to feed each elephant.





		Size of bag	Number of bags	Number of peanuts elephant gets
Pinky eats	15 to 20 peanuts	9	2	18
Nosey eats	20 to 35 peanuts			
Sam eats	37 to 45 peanuts			
Oscar eats	43 to 48 peanuts			
Rita eats	66 to 71 peanuts			
Dolly eats	25 to 38 peanuts			
Candy eats	18 to 27 peanuts			



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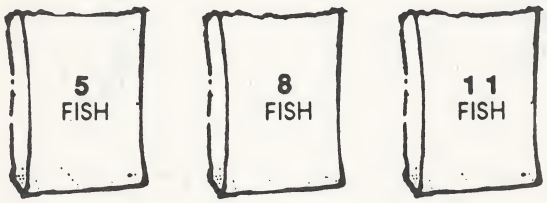
MATH SHOP JR.
Worksheet 20

Name:

Now it's time to feed the seals! Be sure not to feed them too much or too little. Use as many of each size bag of fish as you want.



		Bags with 5 fish	Bags with 8 fish	Bags with 11 fish	Total fish
Harry eats	20 to 23 fish	0	0	2	22
Raul eats	23 to 26 fish				
Beanie eats	25 to 29 fish				
Dandy eats	39 to 43 fish				
Eloise eats	44 to 47 fish				
Bingo eats	8 to 14 fish				
Tina eats	17 to 24 fish				

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WORKSHEET ANSWER KEYS

Worksheet 1

metal; 2 cents
plastic; 3 cents
metal; 4 cents
plastic; 2 cents
metal; 7 cents
plastic; 9 cents

7 cents
12 cents
7 cents

Worksheet 2

Soccer	Basketball
6	10
4	6
3	5
1	1
5	2
11	

Whippets
Penguins

Worksheet 3

2 darts each:
Tom: 5, 5
Emily: 5, 6

Daniel: 2, 3
Daniel: 3, 6

Flora: 3, 3
Tom: 2, 5

Emily
Tom

3 darts each:
Jamal: 3, 3, 7 *or* 3, 5, 5 *or* 1, 5, 7 *or* 4, 4, 5
Emily: 1, 5, 5 *or* 1, 3, 7 *or* 3, 4, 4 *or* 3, 3, 5

Akiko: 5, 5, 7 *or* 3, 7, 7
Tim: 1, 4, 7 *or* 3, 4, 5 *or* 4, 4, 4

Flora: 5, 7, 7

Worksheet 4

Ted, 5	Ivan, 1					
Ted, 5	Andy, 3	*or*	Sam, 2	Jeff, 6	*or* Juan, 5	Ivan, 1
Juan, 7	Jeff, 6					
Juan, 7	Andy, 3					
Ted, 5	Jeff, 6					
Sam, 2	Ivan, 1					

Worksheet 5

2, 3
2
2, 7
7
3, 7
2, 3, 7
3

Worksheet 6

2, 3, 7 or 5, 7 or 3, 9
2, 3, 5 or 3, 7
3, 5, 7
3, 5, 9 or 2, 3, 5, 7
2, 5, 7 or 5, 9 or 2, 3, 9
2, 7, 9
3, 7, 9 or 2, 3, 5, 9
2, 3, 7, 9 or 5, 7, 9
2, 5, 9 or 7, 9

Worksheet 7

Mr. Odd
1, 3, 5
7, 9
5, 7, 9
5, 9
1, 5

Ms. Even
2, 6
2, 6, 10
2, 10
6, 10

Worksheet 8

Odd
Even
Even
Odd
Odd
10, 12
99 cents
24 cents

Worksheet 9

36 cents
53 cents
65 cents
59 cents

Various combinations

Worksheet 10

2, 2, 0, 2
1, 1, 0, 4
3, 1, 1, 1
0, 1, 1, 3
3, 2, 0, 4
2, 0, 1, 2
3, 1, 0, 1
1, 0, 0, 0
1, 2, 0, 2
2, 1, 0, 3

Worksheet 11

3
7
2
3
3
7
6
10
11
6

Worksheet 12

11
30
7
18
6
8
3
5
6
16

Worksheet 13

2:30
3:30
2:00
3:20
3:00
4:15
3:45
7:15
10:00
8:05

Worksheet 14

5:30 p.m.
11:25 a.m.
10:15 a.m.
6:23 p.m.
8:15 p.m.
6:10 p.m.
6:02 p.m.
10:12 a.m.
5:55 a.m.
12:57 p.m.

Worksheet 15

15
12
32
49
8
120
9
18
40
93
35
20

Worksheet 16

2
2
5
3
5
8
4
4
5
4
7

Worksheet 17

11
5
4
8
4
1
2

Worksheet 18

7, 2
9, 2
4, 4
9, 3
4, 6
7, 3
4, 3

Worksheet 19

Various combinations

Worksheet 20

Various combinations

Why *Math Shop Jr.*?

by Cary Hammer

Mathematics is a subject about which most elementary and high school students tend to have strong feelings. In the average school, a small percentage of students have a fascination as well as a seemingly effortless facility with the workings of numbers. Conversely, a great proportion confess complete bafflement with the very notion of math, and thus a total lack of interest in the subject. What is striking is how few students fall somewhere between these two extremes. Why is it that mathematics, perhaps more than any other academic field of study, is such an all-or-nothing proposition?

Perhaps a clue is to be found in students' differing views of what math is all about. Some see it as an elegantly logical and endlessly fascinating game. Others consider math to be an arbitrary and restrictive set of rules, under the domain of which any given task is a tedious and meaningless chore. While these two views are perhaps equally valid, it is clear that the student who sees the game buried beneath the numbers is likely to dig more deeply into them. A student who views a learning experience as fun and relevant is more likely to develop a positive attitude toward the subject. But it is in the field of mathematics that this viewpoint seems to vary to the greatest degree.

Mathematical attitude affects mathematical aptitude. The educational problem is one of determining how best to encourage the proper frame of mind. In mathematics, the extent to which a student views a given exercise as entertaining is largely dependent on the ease with which she can perform the low-level number manipulations involved. The student who must agonize over the basic arithmetic operations necessary in tackling a complex rate-time-distance problem is much less likely to appreciate the final elegance of its solution. However, the student for whom the processes of addition and subtraction are more automatic tends to focus the bulk of her attention on the more interesting problem-solving aspects of the task.

In considering these sorts of learning situations, the difference between computers and pencils becomes particularly clear. Unlike a pencil, a computer can automatically handle the more tedious elements of a math problem, freeing a student to concentrate on the higher-level logic involved. Thus, it is this approach of decreasing the distractions along the way to effective mathematical problem solving that I have used as the focus of *Math Shop Jr.*

Math Shop Jr. is a vehicle for honing basic arithmetic skills, in addition to developing problem-solving techniques. However, enough of the burden of arithmetic computation has been shifted to the machine to allow students to more easily see the overall dynamics of each type of problem. Due to the spreadsheetlike structure of *Math Shop Jr.*, when a student enters a possible answer to a given problem, he immediately sees how this value affects every aspect of the problem. Just as an executive, using a spreadsheet program to rework a financial plan, can see how a lowered production cost would affect all segments of the budget, the student is given a broad vantage point on the problem. Thus, the student is never merely told that he is wrong; instead he is allowed to observe, to his own satisfaction, exactly *why* a given answer doesn't work.

In addition, the problems posed by *Math Shop Jr.* are framed in a visual, rather than verbal, context. Each challenge is presented in the form of a graphic screen depicting the real-world setting of the problem, such as a Bank or a Flower Shop. This allows the student to more easily perceive the structure of the task, and encourages a specific organizational method for its solution.

Perhaps the most apparent dimension of *Math Shop Jr.* is the gamelike framework which offers an incentive for problem solving. This type of structure is an ideal context in which to present math problems, as the average student needs little coaxing to try a new game. However, *Math Shop Jr.* is not the typical computer game in which the student pilots a colorful flying saucer through the galaxy while shooting down equally-colorful enemy creatures, occasionally earning more fuel by correctly solving algebraic equations. This method promotes the sort of "do your work and you'll get some candy" approach that immediately cues the student that the task at hand is so inherently dull that it requires an artificial reward. The student's attention and interest consequently are focused toward flying saucers and away from the numbers.

The design strategy underlying *Math Shop Jr.* takes a different tack. Rather than creating an entertaining game, and then searching for holes into which math problems can be force-fit, I think it is better to work in the opposite direction. By beginning with the mathematical concepts, and working from the logical challenges which make them intriguing and gamelike in and of themselves, I have tried to build an overall game structure which is integrative with, rather than distracting from, the primary concepts. I hope *Math Shop Jr.* will demonstrate that, given free rein to show off, and the proper stage on which to perform, mathematics can be entertaining enough in itself without being dressed up in silly costumes.

Mathematics is a science of finding that which is not completely hidden; that which is only obscured by complexity. Sadly, the entertaining nature of mathematics itself can be one of its most darkly obscured truths. Hopefully, *Math Shop Jr.*, by presenting mathematics in a different light, will help students to uncover this all-too-well-kept secret.

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